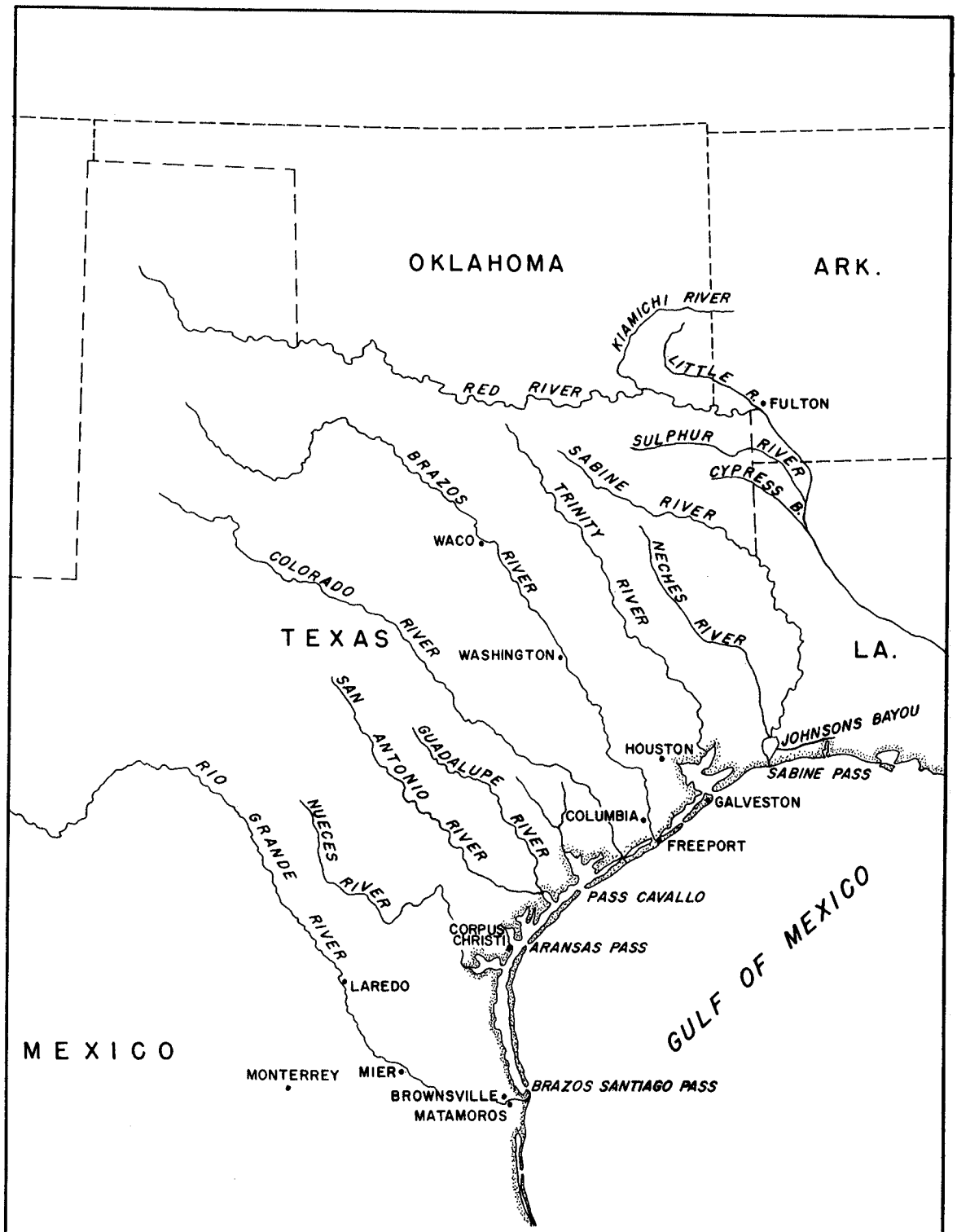


GALVESTON DISTRICT, 1919

5

Proliferation of Ports

Abolition of the Dallas District in 1919 led to considerable enlargement of Galveston District boundaries. Encompassing far more than the already significant activities along the coast, Galveston's responsibilities were extended to include all works of improvement in Texas plus the Red River in Texas, Oklahoma, and Arkansas above Fulton; Sulphur River, Texas and Arkansas; Cypress Bayou and waterway between Jefferson, Texas and Shreveport, Louisiana; Kiamichi River, Oklahoma; Little River, Arkansas; and Johnsons Bayou, Louisiana. The main coastal legacy from the defunct Dallas District was the Sabine-Neches Waterway. Since 1919, Galveston District alone has borne continuous responsibility for all navigable waters along the booming Texas Gulf Coast.

History of the Texas Coast reveals a pattern that characterized the growth of each major port. First documented in the surveys of 1853, prevailing conditions consisted of bars blocking potentially navigable passes, erosion of the heads of the southern islands at the passes, and corresponding southward shifts in channel locations. Local interests attempted modest and isolated corrective measures after the Civil War, followed by the army engineers, who conducted examinations and surveys in the 1870s and a far-flung program of initial improvements in the early 1880s. After five or six years, most of these withered as it became painfully clear that government resources were spread too thin and that a single western Gulf port should be selected for deep-water improvement.

After 1889, when Galveston was named beneficiary of the concentrated efforts of the government to furnish a port for the "Trans-Mississippi West," a short-lived era of private activity dominated the Texas Coast. Harbor and channel companies were chartered under state law to undertake deep-water channel improvements. Some of these works proved overly ambitious and, for the most part, ruinously expensive for the corporations that sponsored them. Before the turn of the century, most private works had been turned over to the government; army engineers assumed responsibility for their maintenance and, where necessary, their completion.

Chronologically, progression of ports along the coast followed the westward movement of settlement in the state and the extension of the railroads. Such social, political, and economic forces help account for the time span between creation of the deep-water port at Galveston in 1897

and completion of the channel to Brownsville in 1936. During the intervening years, other deep-water ports that had been spawned emerged along the coast in almost east-to-west geographical order.

The Port That Sulphur Made

With the Brazos River running through the region of Texas most conducive to agricultural productivity, early planters naturally looked to this stream as a potential avenue for navigation. Crops of cotton and sugar were cultivated in the fertile fields along the river. By 1832, the Brazos already sustained considerable commerce. Longest river in the state, it differed from most others by emptying directly into the Gulf without an intermediary tidal basin. The Brazos was not, however, an ideal candidate for dependable navigation, impeded by many rocks, shoals, bars, snags, bends, rapids, and variable water levels. A further hindrance lay in the shifting bar, fluctuating in depth from 4 to 10 feet, where the mouth of the river flowed into the Gulf.

Examining this bar in 1853, Lt. W. H. C. Whiting was not overly optimistic about its improvement:

> . . . one heavy blow of twenty-four hours' duration would neutralize the labor of weeks.[1]

Presumably having arrived at the same conclusion several years earlier, the Galveston and Brazos Navigation Company was chartered on February 8, 1850, to build an inland canal linking the river with West Galveston Bay and thereby avoiding the bar. Envisioned by Stephen F. Austin as early as 1822, this canal was completed in the middle 1850s to a depth of 3½ feet. The 50-foot-wide canal could accommodate steamboats, rafts, and other small craft. Initially successful, it was gradually neglected as dredging costs proved prohibitive for the company and capital was diverted to the glamour stock of the day, the railroads.[2]

In the years 1857-58, Texas spent $60,000 to improve the Brazos from its mouth upstream about 250 miles to Washington, the head of high-water navigation during favorable seasons of the year. This improvement was insufficient; by 1874, when R. B. Talfor surveyed the 430 miles from the mouth to Waco, he noted that only two steamers ran as high as Columbia, representing "the entire commerce of the river." Houston had tapped the trade of the upper Brazos and drawn it away from the river above Columbia, the head of low-water navigation.[3]

Snag boats were put into operation below Washington in the early 1900s. The only major effort to improve the river above Washington was

U.S. snagboat Waco *on Brazos River*

initiated by the rivers and harbors act of 1905, which authorized examination of the 175 miles from Old Washington up to Waco.[4] The Galveston District conducted this examination.

Justification for improvement above Washington lay in the absence of a suitable water route along which the substantial cotton crop yielded in this valley could be transported to Galveston, the state's leading cotton port. Capt. Edgar Jadwin reported the possibility of securing a 4-foot navigational depth for four months of the year and 3½ feet for six months. His plan provided for eight locks and dams plus 103 miles of open channel. Responsibility for executing this work passed to the Dallas District in 1907 with the transfer of the Brazos River above its mouth (from Velasco to Waco). This portion of the river was returned to the Galveston District in 1912. Army engineers completed the first two locks, 170 feet long and 55 feet wide, taking over their maintenance and operation in 1915 and 1917. By 1918, only four locks and dams had been authorized; still no traffic plied the river and none was anticipated until the entire improvement would be finished. Wartime operations interrupted further work and, in 1922, Congress abandoned the scheme of navigational locks and dams on the Brazos River altogether.[5]

Improvements at the river's mouth followed a course that ultimately proved more fruitful. In March of 1872, Captain Howell recommended that converging jetties of closely driven palmetto piles be constructed. Congress first authorized federal improvement on June 14, 1880, with a $40,000 appropriation for jetty construction. Major Mansfield began work the following year on brush, stone, and concrete parallel jetties. By 1886, construction was but partially completed, only 27 percent of the estimated cost had been expended, adequate depth had not been obtained over the bar, and operations were suspended for lack of funds.[6]

In September, 1887, Maj. Oswald H. Ernst reported the disappearance of a considerable part of the northeast jetty due to subsidence, wave action, and teredo devastation. Discouraged by these results, Ernst thought the Brazos could better be opened to commerce by deepening the old Galveston and Brazos Canal. He recommended abandoning the jetty project.[7]

While Ernst's recommendation was being considered, the state legislature added to the general statutes a new chapter authorizing creation of private corporations for the purpose of constructing, owning, and operating deep-water channels from Gulf waters to safe harbor on the mainland. On February 16, 1888, the Brazos River Channel and Dock Company was organized, receiving authorization from Congress on August 21 to improve the mouth of the Brazos. From 1889 to 1896, this company was engaged in building two parallel jetties, 560 feet apart, and several wing dams or spur dikes along the river bank to control the currents. It also established a port at Velasco, about 5 miles above the mouth on the eastern bank of the Brazos. Unable to finance completion of the project,

however, the company transferred its works, rights, and privileges to the United States on April 25, 1899.[8]

Taking over this responsibility, the army engineers adopted a project to repair and strengthen the jetties, construct spur dikes, and dredge a channel 18 by 150 feet. By 1908, all but the dredging had been accomplished. The channel, which then ranged in depth from 13 to 19 feet, was not being used commercially; the costly job of dredging was postponed until such time as commercial interests would justify further work.[9]

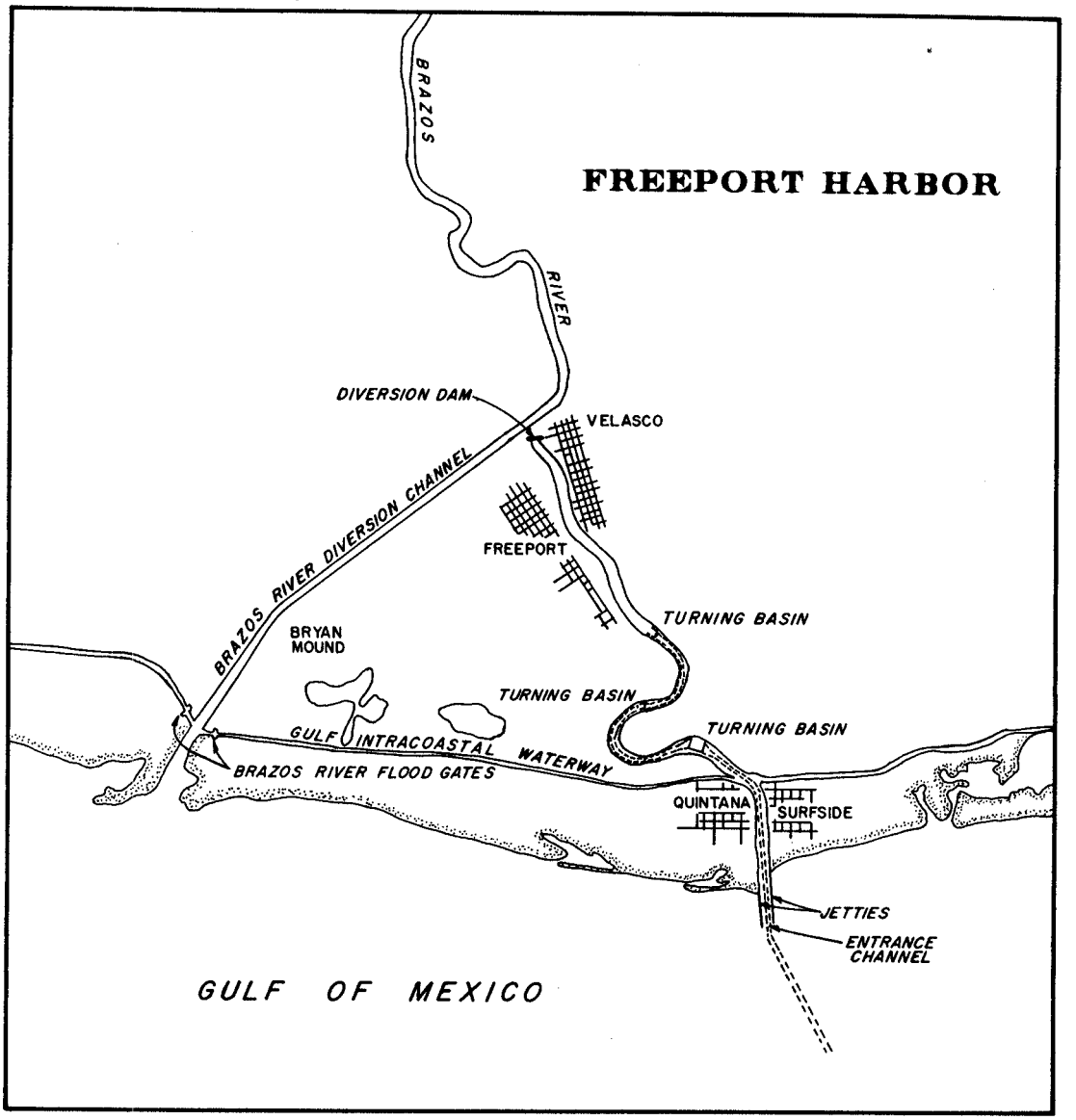
By 1912, the Houston & Brazos Valley Railway had extended its line from Velasco, a town of six hundred inhabitants, down to a point about 1 mile above the end of the jetties and the Corps had just finished dredging a channel to the railway wharf. The railroad company had purchased the steamer *Honduras*, to make regular runs between New York and the Brazos River. Because of the prevailing depth at the latter, 18 feet or less, the ship was often compelled to call at the ports of Port Arthur or Galveston and discharge part of its cargo before proceeding to the Brazos.[10] While the commerce generated by this operation represented an increase, it was still insufficient to justify more extensive government improvement at the mouth of the Brazos, and Galveston District Engineer Maj. Earl I. Brown stated,

> As a competitor with the port of Galveston, only 45 miles away, I do not believe the mouth of the Brazos will ever amount to much unless some additional advantages are given to it.[11]

In the same report, Major Brown followed this gloomy prediction with announcement of a new development on the Brazos horizon which indeed brightened future prospects for this locale.[12]

Four miles west of the river mouth, an extensive deposit of sulphur had been discovered. In 1912, construction was already in progress on a plant for extracting the sulphur and a New York syndicate was preparing to launch the Freeport Sulphur Company. The eastern capitalists, controlling all land adjacent to the river, planned to develop a town, a port, and diversified industrial growth. The proposed port would "be free" with "no wharfage or other charges being imposed on commerce."[13] With the sulphur company as its backbone, Freeport was in its infancy, but on the verge of a growth spurt.

Within barely two years, conditions at the mouth of the Brazos had changed considerably: the town of Freeport had been established several miles above the jetties on the west bank of the river, an additional steamer had been added to the line running to New York, and the Missouri, Kansas & Texas Railway had acquired trackage to the port.[14] The thinking of the



army engineers had changed too, as manifested by this statement by a member of the board of engineers reviewing studies preliminary to securing a 25-foot depth:

> Much stress has been laid upon the necessity of better port facilities at this point, not only because of the growing local commerce, but on account of material benefits that would result to a large portion of the State of Texas by reason of an additional competitive port. It appears that at times there is considerable congestion in the port of Galveston, which operates to the disadvantage of the shippers and jobbers through a large section of the State. It has been represented that the

Jetties and harbor at Freeport

> terminals at Galveston are under such control as to make the wharfage charges and the transfer of freight unduly high, and that this difficulty would be largely alleviated by a deep-water port at Freeport by virtue of its being in fact a free port.[15]

Soon the Corps was improving Freeport Harbor with a project for a "reasonably permanent channel about 22 feet." The area was growing and

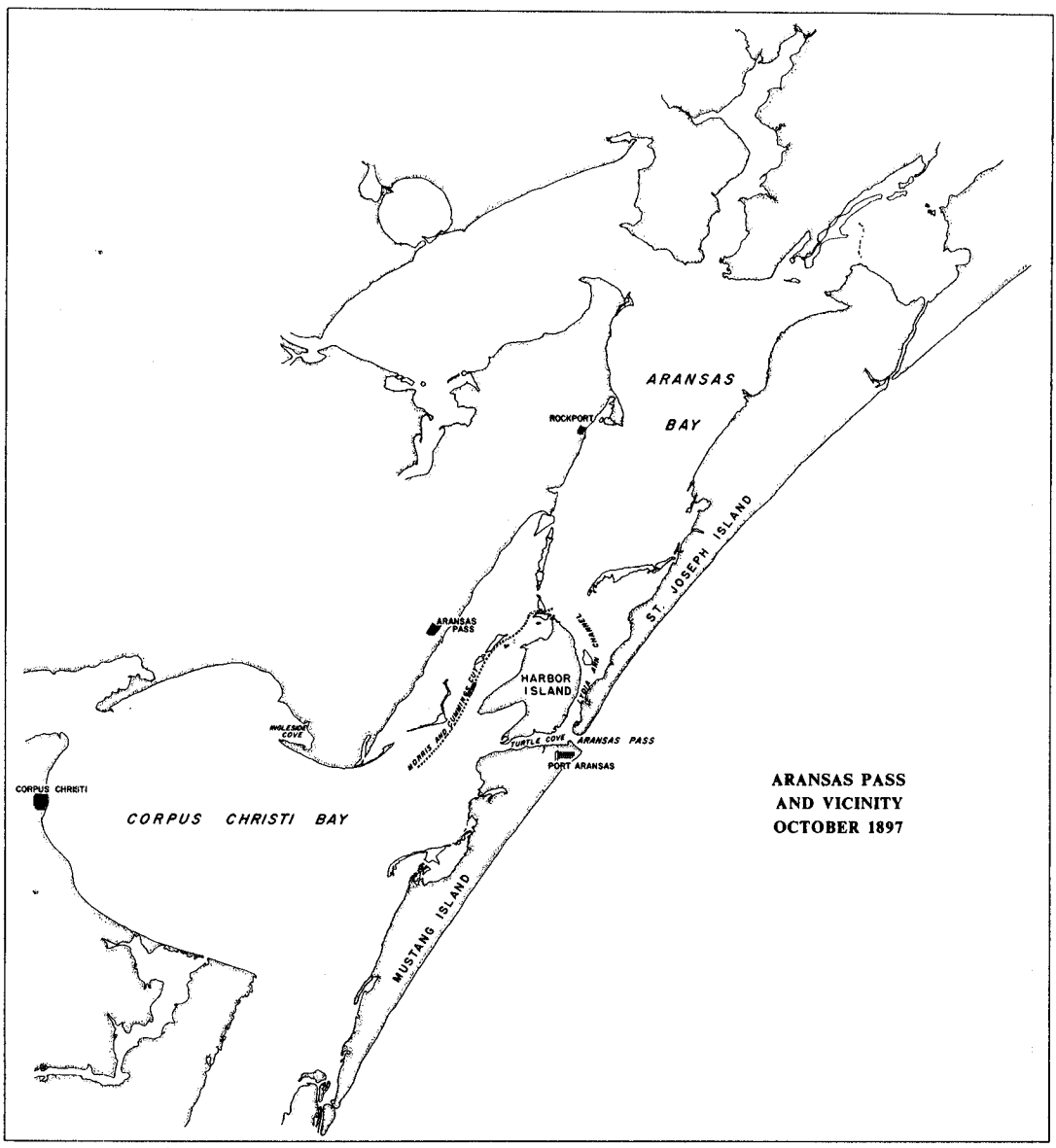
industrializing, but channel maintenance was proving problematic. The lengthy Brazos River was subject to torrential floods and sudden rises. When these occurred, the river carried great quantities of silt downstream, thereby counteracting improvements achieved by dredging at the mouth. After evaluating a number of alternatives, the engineers found a solution in a diversion dam 7 miles upstream and a diversion channel flowing into the Gulf west of the natural channel. This plan was authorized by Congress on March 3, 1925 and the project was completed in September, 1929. As a result, the Brazos found a new outlet to the Gulf and the original mouth of the river was afforded protection that would insure its development into a major coastal port.[16]

Subsequent years witnessed the success of Freeport Harbor. The Corps of Engineers gradually enlarged the channel. New industries moved in; by the middle 1950s, chemical and petroleum companies had supplanted sulphur in accounting for the principal economic activity at Freeport. Turning basins were added and in 1954 the Brazos River Harbor Navigation District constructed Brazos Harbor, a terminal facility extending west of the federal channel. In 1958, Galveston army engineers added Brazos Harbor to their maintenance responsibilities. The most recent development in Freeport's history was authorization for a 45-foot channel depth in 1970.[17]

Progress at Aransas Pass

When the illustrious Lt. George B. McClellan reported on his survey of the bars from the mouth of the Rio Grande to Pass Cavallo in 1853, he expressed unqualified pessimism about their prospects for improvement. The difficulties and complications that attended future developments at Aransas Pass and its adjacent bays probably would not have surprised him. An involved series of improvements was begun by the Aransas Pass Road Company in 1852 and continued by a number of other private corporations. The only notable early accomplishment was a channel, excavated by the city of Corpus Christi under an 1854 authorization from the state legislature, to connect Corpus Christi and Aransas bays. This 7-mile-long channel proved inadequate, however, and the city later contracted with the firm of Morris & Cummings to dredge an 8-by-100-foot channel. Completed in 1874 and known thereafter as the Morris & Cummings Cut, this channel ran along the inshore side of Harbor Island and connected with Aransas Pass through the Lydia Ann Channel which lay between Harbor Island and St. Joseph Island.[18]

The first improvement at Aransas Pass itself was attempted in 1868 by the citizens of Rockport, 12 miles north of the pass. They subscribed



$10,000 and built a 600-foot-long dike on St. Joseph Island; however, when army engineers surveyed the pass in 1870, no trace of this work remained. After a second survey conducted in 1878, a board of engineers recommended a project including construction of parallel jetties (one extending from the south end of St. Joseph Island, the other from the north end of Mustang Island) and protection for the eroding head of Mustang Island. One member of the board thought a single jetty extending from Mustang Island might suffice, but later experience would demonstrate the necessity for a paired jetty.[19]

From May of 1880 until 1885, work at this location was conducted under Major Mansfield. Erosion on Mustang Island, amounting to 260 feet per

year, was significantly reduced to about 70 feet annually by construction of seven groin jetties together with a breakwater and mattress revetment along the channel face of the island. The project also included locating sand fences on the heads of both islands, planting trees on St. Joseph Island, and building a south jetty 5,500 feet long. This jetty, known as the "Mansfield jetty" or the "Old Government jetty," was constructed of brush mattresses and stone, with high portions of inshore superstructure temporarily capped with piles and stones. The jetty started at Mustang Island and ran out to the *Mary*, from which it continued on by a sharp curve northward. The *Mary*, a Morgan Line sidewheel steamer, had been wrecked on November 30, 1876.[20] Despite recommendations of engineers during the early years of the district, the *Mary*'s wrought iron hull has remained at the site where it sank, lying submerged just south of the present main channel.

Many years later, Maj. Gen. Lansing H. Beach, recently retired chief of engineers, wrote Maj. (later Maj. Gen.) Julian L. Schley, then district engineer at Galveston. The former chief of engineers shared with the future chief his reminiscences of Aransas Pass:

> When I first saw that locality in 1884 it was very different from what it is today. Then the only communication was a Morgan Line steamer about once in ten days. Sometimes they would stop, or rather slow down and let one climb aboard, sometimes not, . . . I had some rare experiences getting around that part of the world and sometimes went hungry, but it was great "life in the open"; open was about all there was to it sometimes.[21]

Major Ernst made a new survey in March, 1887, soon after he arrived at Galveston. Reporting that the protection of Mustang Island had only partially accomplished its objective, he advised giving top priority to laying an 18-inch-thick riprap cover. This revetment, completed by May, 1889, prevented further erosion and was found to be in good condition when examined in 1897.[22]

As for the jetty, Ernst found it had settled badly and had not produced a significantly deeper channel. He submitted a project for two parallel stone jetties, 2,000 feet apart out to the 20-foot curve. The south jetty he proposed would incorporate the Mansfield jetty to a point a little beyond the *Mary*, from which it diverged to the southeast and continued out in a straight line.[23]

Although a board of engineers approved the Ernst project on July 19, 1887, these jetties were never built. At first the limited funds made available were applied to the more urgently needed Mustang Island revetment. Soon after this protective work was finished, the selection of

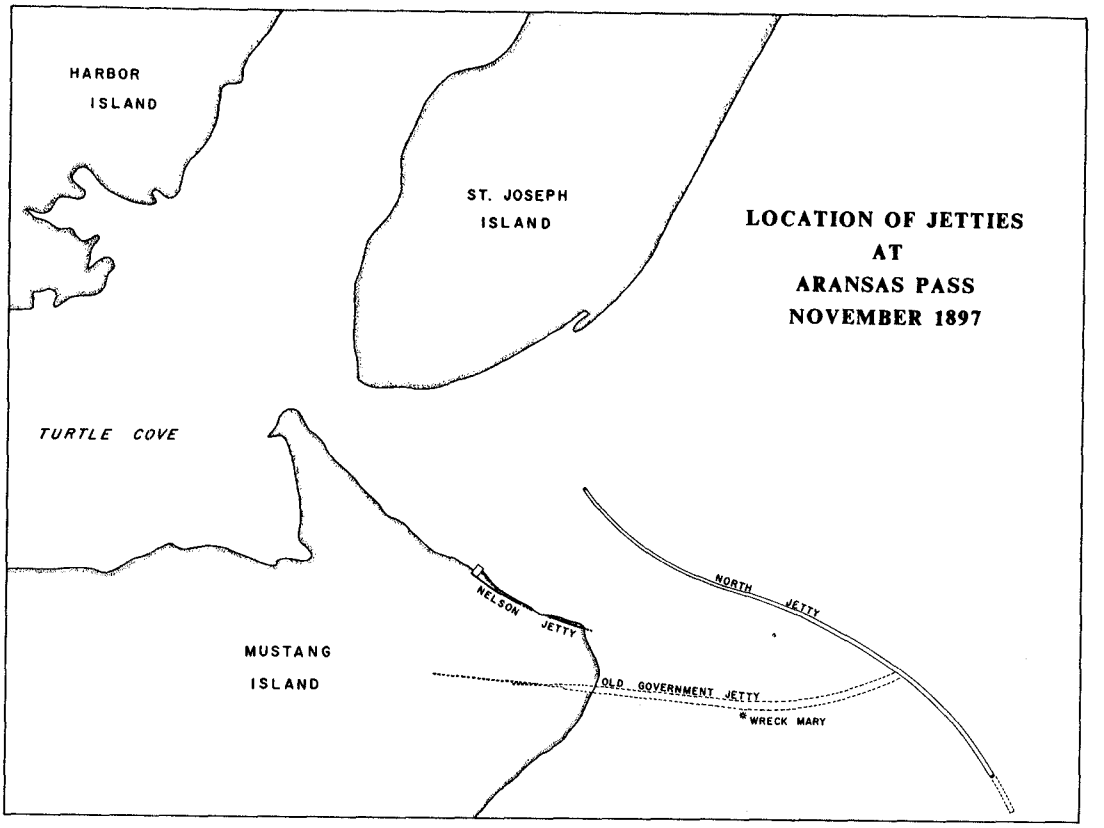
Galveston as *the* deep-water harbor to be developed on the Texas Coast drew away major appropriations that had been hoped for at Aransas Pass and other incipient ports. Consequently, several private corporations were chartered about that time, but only one made lasting harbor alterations at Aransas Pass.[24]

The Aransas Pass Harbor Company, incorporated on March 22, 1890, received congressional approval on May 12, 1890 to build and own structures necessary to achieve a 20-foot-deep channel across the outer bar. The state granted the harbor company the right to purchase land on portions of Harbor and Mustang islands at the rate of $2 per acre, dependent on the company's securing 20 feet over the bar by the year 1899.[25]

The harbor company erected two jetties. The first, called south or Nelson jetty, was built about 1892 and located some 600 to 1,000 feet nearer the channel than the line of the old Mansfield jetty. Consisting of a row of light cylindrical wooden caissons which were 7 feet in diameter and filled with sand and stone, this jetty extended 1,800 feet from the company's wharf on Mustang Island.[26]

The second and principal jetty, known as the north or Haupt jetty, was built between August, 1895 and September, 1896. Plans and specifications for this stone jetty were furnished by two consulting engineers, Prof. Lewis M. Haupt of Philadelphia and H. C. Ripley of Galveston. Ripley may be remembered as the civilian engineer who conducted surveys under Captain Howell as early as 1874 and remained with the Galveston Engineer Office until 1891. At that time, he parted company with the government and set up practice as a civil engineer, specializing in "hydrographic surveying, plans, estimates and specifications for harbor improvements, and other marine works."[27] In this capacity, he would again be called upon to serve Galveston after the turn of the century.

The plan drawn up by Haupt and Ripley conflicted with Ernst's plan and differed from the usual form of jetty, "being detached from the shore and located on the bar to the 'windward' of the channel." Furthermore, the jetty axis was to be "curved (compound and reverse) to produce reactions similar to those found in the concavities of streams." The consulting engineers were confident that construction of a "definite portion" consisting of 3,750 feet would produce a 15-foot depth and that completion of the jetty to a total 6,200-foot length would yield 20 feet. About three-quarters of the work on the Haupt jetty was completed, but the jetty failed to create the anticipated depth. In September, 1896, the company contracted with C. P. Goodyear to provide a 20-foot channel in any way he could. Goodyear used 23,350 pounds of dynamite to blast a channel, some 13,000 pounds being used to blow out about 500 feet of the old Mansfield jetty which then crossed the channel at a 45-degree angle and ran into the line of the new Haupt jetty, but he too failed to deepen the channel.



Finally, the company, having spent $401,554.18, had exhausted all its funds and was obliged to cease operations; it had obtained for all practical purposes no more than 8.5 feet of navigable depth.[28]

In November, 1897, a board of engineers headed by Col. Henry M. Robert examined the works of the Aransas Pass Harbor Company to ascertain their character and value to the government. The board found the scant remains of the Nelson (south) jetty greatly debilitated. The Haupt (north) jetty posed an altogether different problem. The engineers viewed the plan proposed by Ernst ten years earlier as "the proper method of improving this pass to its full capacity." The structures existing in 1897, however, precluded implementation of Ernst's plan; estimated costs for removing the entire Haupt jetty were prohibitive. Thus, the board devised a plan which called for removal of only the outer portion of the Haupt jetty, utilizing the rest of it as a north jetty in conjunction with a new south jetty to be built; at the same time, the board expressed these reservations:

> . . . the improvement of this pass has been greatly complicated by the works constructed by the Aransas Pass Harbor Company, and the pass will never be as good as it would have been had these works never been constructed. . . .[29]

The rivers and harbors act of 1899 authorized the government to take over the company's works, assessed by the board to have a value of "nothing," and to remove the Mansfield jetty from its outer end to the wreck of the *Mary*.[30]

Removal of the Mansfield jetty was a long, drawn-out affair. Work completed by contract in 1904 was considered to have removed 1,000 feet to a depth of 25 feet. In fact, although the old jetty had indeed been broken up, the channel remained shoal; later engineers believed that the scattered stone particles from the jetty prevented scouring action necessary to deepen the channel. Around 1911, the district again turned its attention to removal of the jetty.[31]

The task proved no easier this time around. Scattered stone had to be located and removed before the channel could be effectively dredged. The "junior engineer" stationed at the Port Aransas suboffice on Mustang Island indicated the only way this could be accomplished was "to sound around with an iron shod pole and when rock is found place the dredge and remove the same." Pressures on District Engineer Col. C. S. Riché to complete this project prompted him to stretch his verbal ingenuity as he wrote the engineer at Aransas Pass to "please see that all the 'pushancy' needed is applied." The harassed junior engineer seems to have adopted a regimen of personal "pushancy," later informing Riché, "I personally sleep on the job and am on the work every morning before daylight."[32] Early in 1915, removal of the old jetty to a point 1,000 feet from the north jetty was once again considered complete. The work had been accomplished to within 300 feet of the wreck *Mary* and shoal conditions prevented further operations.

After the Aransas Pass Harbor Company relinquished its improvements and rights on March 27, 1899, the Corps of Engineers decided to complete the north jetty in accordance with Haupt's plans and specifications. This work, authorized in 1902 and 1905, was completed by June 11, 1906.[33] Conditions continued to deteriorate, however, with the channel

> . . . approaching dangerously near the [north] jetty, and finally a secondary channel, 600 feet wide and 6 feet deep, broke through the gap between jetty and shore with the result that for all practical purposes the channel was on the north side of the jetty instead of the south side, as intended . . . .[34]

Thus, the engineers were forced to come to grips with the inadequacy of a lone jetty and the undesirability of the gap between the jetty and St. Joseph Island; the result was authorization in 1907 for construction of a south jetty and an extension connecting the inshore end of the Haupt jetty

Aransas Pass jetties

to St. Joseph Island. By 1919, the north and south jetties had reached their present lengths of 9,241 feet and 7,385 feet, respectively.[35]

As the channel finally began to deepen, a suitable harbor to accommodate the ships navigating the channel became the next priority; army engineers proceeded to establish a roadstead at the Harbor Island basin, opposite the entrance channel through the pass. They also constructed a stone dike on the unstable St. Joseph Island to prevent the emergence of unwanted passes that tended to cut through from the Gulf across into Aransas Bay following severe storms. This structure was designed to concentrate, and thereby increase, tidal flow through Aransas Pass. By 1916 the levee extended 20,991 feet from its junction with the north jetty. The year 1913 saw authorization for a 25-foot jetty channel and for a 12-foot approach channel from the Harbor Island basin to the town of Port Aransas on Mustang Island. The approach channel was completed in 1914 and dredging in the jetty channel was continued by the seagoing hopper dredges *Galveston*, *Charleston*, and the new *Comstock*, put into service in March, 1916. Concerned that proximity of the channel to the north jetty might jeopardize this structure, the engineers decided in 1920 to

straighten the channel by the addition of four riprap spur dikes, constructed by December, 1922.[36]

Nature intervened about this time. The area around Aransas Pass had not been beset by a major storm in the thirty years since 1886; local residents had tended to forget the destructive effects of earlier hurricanes and to underemphasize the importance of an adequately protected harbor. Two storms, one in 1916 and a more violent sequel in September, 1919, served as painful reminders that this area was just as vulnerable as were other points along the coast.

On June 5, 1920, Congress authorized preliminary examination and survey of the vicinity "with a view to the establishment of a safe and adequate harbor."[37] The towns of Rockport, Aransas Pass, and Corpus Christi vied for this designation. It was understood that only the port selected would require a deep-draft channel.

Three channels then connected Aransas Pass with the mainland. The shortest, a 6-mile passage with dimensions of 8½ by 75 feet, had been dredged in 1909-10 by the Aransas Pass Channel and Dock Company; it extended from the docks on Harbor Island, across the island, to the town of Aransas Pass. A 13-by-80-foot channel to Rockport extended 10 miles from the head of the pass; this channel had been dredged by the Engineer Department for the U.S. Shipping Board Emergency Fleet Corporation in 1918-19. The Aransas Pass-Corpus Christi Channel ran through Turtle Cove and across Corpus Christi Bay, some 21 miles. This channel had first been improved under the rivers and harbors act of 1907 to 8½ by 75 feet; in 1910, Congress adopted a 12-by-100-foot project, which was completed in 1914. By 1920, this channel had shoaled considerably and was not being extensively used, the principal activity being barge transportation of Mexican fuel oil.[38].

Of the competing communities, Corpus Christi offered the greatest advantages. Although this city's population had dropped from fifteen thousand to ten thousand after the 1919 hurricane, its citizens wasted no time in taking steps to prevent another such disaster and began building a breakwater that would protect its waterfront. Necessitating the longest channel from the pass, Corpus Christi nevertheless had a number of compelling points in its favor — service by four railroads, three banks, ample room for expansion, and plans for an enterprising navigation district. With cattle ranches to the west, farm ranches to the north, and fish and oysters in the adjoining bays, the city was destined to grow and flourish. Diversification of agricultural efforts in the surrounding areas added rice and varied food produce to the principal commodities of cattle, corn, and cotton. Discovery of natural gas near Corpus Christi promised still more economic benefits.[39]

Old Corpus Christi Area Office

The fabulous King Ranch had gained a foothold between Corpus Christi and Brownsville, responsible to an immeasurable extent for bringing transportation, population, and economic enterprise to South Texas. Robert J. Kleberg, ranch manager and son-in-law of the pioneering Capt. Richard King, provided leadership to the Deep Water Harbor Association for South and West Texas plus funds enabling Roy Miller to lobby in Washington on behalf of a port at Corpus Christi. In 1922, these efforts bore fruit.[40]

Corpus Christi was selected. A 25-by-200-foot channel through Turtle Cove and across Corpus Christi Bay was begun in January of 1925 and completed in July of the following year.[41] On September 14, 1926, Corpus Christi officially opened its harbor to commerce.

Even before the new channel was finished, the Galveston District recognized the advantages of opening a permanent field office at Corpus Christi. While final operations on the channel were handled from the suboffice at Port Aransas, negotiations for suitable sites were entered into with the Nueces County Navigation District. When transfer of land was completed in 1929, construction began on the new field office, garage, warehouse, wharf, and bulkheads. The white, latticework office building sat on a bluff overlooking the ship channel and housed the Corpus Christi Area Office until a new structure was erected across the street in 1974. The responsibilities of this office have increased over the years to include maintenance of 328 miles of dredged channels.

Spectacular growth accompanied the new port at Corpus Christi. By 1929, the city's population (twenty-six thousand) had more than doubled since 1920 when the harbor improvement was recommended. Commerce on the waterway jumped from 96,000 tons in 1922 to 4,216,000 tons in 1929. Cotton and oil comprised a major portion of this total. The water-

way, too, was destined to grow. Authorized depths gradually increased from 30 feet in 1930 to 45 feet in 1968.[42]

In September, 1934, local interests completed dredging a 7,374-foot-long industrial canal, 30 by 100 feet, and an equally deep turning basin at Avery Point, 800 by 1,000 feet. Maintenance and future improvement of these additions were turned over to the Corps of Engineers in 1935. Three years later, Congress authorized the army engineers to extend the canal another 4.2 miles to a turning basin near Tule Lake; authorization followed in 1958 for a further 2.2-mile extension (Viola Channel) and turning basin at Suntide Refining Company. The same act gave the government engineers responsibility to maintain and improve the shallow-draft Jewel Fulton Canal and turning basin, privately dredged from La Quinta Channel through Ingleside Cove to Kinney Bayou.[43]

Early in 1953, Reynolds Metal Company completed plant facilities on a 1,700-acre site with 2,700 lineal feet of shoreline frontage along the north shore of Corpus Christi Bay. The $122 million complex was designed to process aluminum ore (bauxite) into alumina, which would then be reduced into aluminum metal. The operation required 2,000 tons of bauxite daily. The company planned to transport the ore by ship from its mines in Jamaica, West Indies, and was constructing a vessel specifically for this purpose, with a deadweight capacity of 13,150 tons and a draft of 27 feet 9 inches when loaded. To accommodate such vessels, Reynolds requested a 32-foot branch channel, from the Corpus Christi Channel to the company's wharf at La Quinta, and a turning basin at the plantsite.[44]

Army engineers rejected a bay route in favor of a 6-mile course running along the shore; this route offered the advantages of 50 percent lower annual maintenance costs and protection for local fishermen, afforded by a continuous embankment of excavated material between the channel and the bay. The shore route would also aid in industrial development of 5 miles of prime, waterfront property on high ground with adequate supplies of fresh water and natural gas. That a channel to La Quinta would promote the production of aluminum, a vital defense metal, further justified it from the standpoint of national defense.[45]

Construction of the channel, 32 by 150 feet, was authorized in 1954 with provision for local interests to contribute 50 percent of the cost. Congress did not appropriate funds at that time, however. Because of the urgency of putting the ore fleet into operation, the Nueces County Navigation District and Reynolds Metal Company proceeded jointly to dredge a channel 32 by 125 feet, completed in 1954. By 1956, the plants were being enlarged; anticipated expansion of operations and government plans to stockpile bauxite required larger ships and a correspondingly larger channel. Further enlargement of La Quinta Channel to dimensions of 36

Corpus Christi Harbor

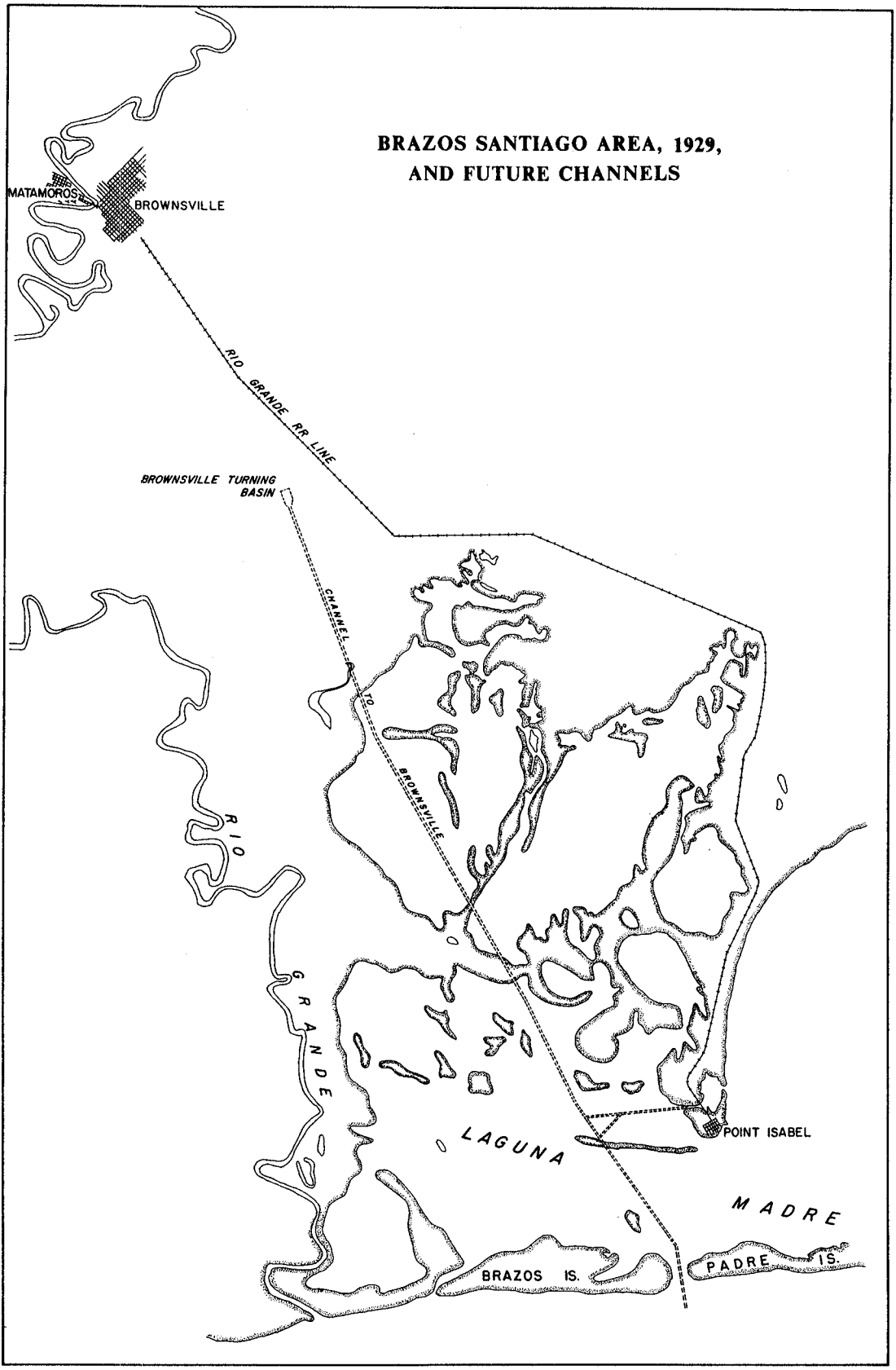
by 200 feet was recommended. In a departure from standard procedure, the chief of engineers also recommended reimbursing the local interests $953,400, the difference between the amount they had expended in their work on the channel and the 50 percent contribution required for the "single user" channel. Deepening to 36 feet was authorized and completed in 1958 and the unusual reimbursement was indeed made a couple of years later.[46]

By 1964, the four port installations (Harbor Island, Ingleside, La Quinta, and Corpus Christi) on the 40-mile waterway were handling commerce approaching 30 million tons composed of 62 percent in petroleum and related products, 26 percent in ores, and about 6 percent in grains. Shipments of petroleum, the principal outbound commodity, moved coastwise; ores constituted the major imported commodity, increasing more than fivefold since 1955. Deep-draft grain shipments tripled during this period. Half of this was composed of grain sorghum, which had ascended greatly in importance after 1956-57, with development of a high-yield hybrid seed by the Texas Agricultural Experiment Station and the United States Department of Agriculture. The trend toward larger bulk cargo vessels and supertankers provided a salient reason for the waterway to be enlarged again. In 1968, a 45-foot project was adopted to accommodate the fully loaded requirements of vessels ranging up to 59,000 deadweight tons with loaded drafts of 41 feet.[47]

El Paso de los Brazos de Santiago

On a July day in the year 1523, the bay at the southernmost pass along the future Texas Coast received the lilting denomination "Brazos de San Iago" (Arms of Saint James). Fittingly named for the patron saint of warriors, Brazos Santiago, as it came to be called, has been host to a tumultuous history, uniquely shaped by its proximity to the Mexican border. The narrative of this harbor and the region it serves has been liberally enriched by those elements that make for romantic and fascinating retelling. Across the pages of the Lower Rio Grande Valley history march legendary heroes of war and revolution, giants of the frontier and ranching industry, audacious outlaws and sordid profiteers; their exploits are set against a background of shifting allegiances, economic and political power struggles, smuggling and illegal enterprises, international intrigues, and hotheaded uprisings followed by vindictive reprisals. The arduous development of this vicinity suffered many setbacks from the unstable scene along the border, undoubtedly delaying the arrival of sound and legitimate commercial well-being.

Existence of the passage between Brazos and Padre islands had been first documented by Alonso Alvarez de Piñeda in 1519, but the sun-


BRAZOS SANTIAGO AREA, 1929,
AND FUTURE CHANNELS
MATAMOROS
BROWNSVILLE
RIO GRANDE RR LINE
BROWNSVILLE TURNING BASIN
CHANNEL TO BROWNSVILLE
RIO GRANDE
POINT ISABEL
LAGUNA MADRE
BRAZOS IS.
PADRE IS.

drenched, sandy shores along the pass saw little port activity for almost another three centuries. Originally serving colonists of Spain and later of Mexico, the port at Brazos Santiago was not actually opened to foreign trade until 1823, when ranchero Martín de León sailed in with a load of luxury merchandise from New Orleans. From then on, it served as the principal port for the trade of southern Texas and northern Mexico. Dry goods were shipped in and specie, hides, skins, and wool were shipped out.[48]

Strategic advantages of Brazos Santiago resided in the shortcomings of the Rio Grande itself. Some appreciation for the devious course of this river may be derived from the fact that while the Mexican town of Mier, head of navigation during the 1840s, was located 175 miles from the Gulf by land, it required a tedious, 250-mile excursion by riverboat.[49] The mouth of the winding river was very shallow, obstructed by a shifting sand bar, and afforded poor anchorage. About 8 miles from the river mouth, the bay of Brazos Santiago (Brazos Island Harbor) offered convenient anchorage. Merchandise unloaded there was transported overland by muleback or oxcart to the river, where it nourished the growth of Matamoros, Mexico, center of the thriving Rio Grande trade. One historian's account describes the tremendous importance of the port:

> The real reason Mexico wanted the territory between the Nueces and the Rio Grande, the real reason for the bitterness and for the war upon that issue, was not twenty-five million empty acres of grassland between the two rivers. It was the location of the little port of Brazos Santiago, the only practicable funnel through which commerce poured into northern Mexico.[50]

Despite its limitations, the Rio Grande supported for a time an extremely lucrative riverboat commerce engaged in the transport of goods and supplies to the ranchos and military outposts upriver. The most successful of these operations was conducted for almost a quarter of a century by the renowned team of Mifflin Kenedy and Richard King. In 1850, these enterprising young men countered the various impediments to navigation by devising a system based upon two different types of ships, both of which were designed by King and built to his specifications. An "outside" steamer, heavy enough to withstand the harsh abuse of Gulf turbulence, hauled cargoes from Brazos Island Harbor to the mouth of the river and 10 miles upstream to a terminal called White Ranch. There, cargoes were transferred to an "inside" vessel, designed with easy handling for maneuvering the succession of curves to be encountered as it

steamed up the river with a loaded draft of less than 24 inches. During high water, the outside vessel might eliminate the one transshipping operation by proceeding directly up to Brownsville, opposite Matamoros. The economy effected by this system wiped out overland transportation; the dual steamboat operation dominated commerce along the Rio Grande until the early 1870s, when the railroads finally presented competition the riverboats could not meet. The Rio Grande Railroad Company, running 22 miles from Point Isabel to Brownsville, brought to a close the era of navigation on the troubled and troublesome river.[51]

The Texas Mexican Railway, connecting Corpus Christi, Laredo, Monterrey, and Mexico City, inaugurated rail service in 1881. Thus cut off from the commercial mainstream, the bypassed city of Brownsville entered into a period of economic decline; correspondingly, port activity diminished at Brazos Santiago. This coincided roughly with the arrival of the army engineers in the area. River and harbor improvements at Brazos Santiago proceeded at a desultory pace in keeping with the economic ills of the Lower Rio Grande Valley. The year 1878 marked the first federal improvement when the engineers removed debris from the wreck of a bark, the *Réne des Mers*, from the harbor. In the early 1880s, Major Mansfield began constructing a south jetty at the pass; this jetty extended a length of 3,955 feet when lack of funds brought the work to a halt.[52]

As the only avenue for the meager commerce of the locality, the little port was served by light-draft vessels from Galveston and New Orleans and by the 22-mile, narrow-gauge Rio Grande Railroad between Point Isabel and Brownsville. In 1904-05, the Corps of Engineers furnished further improvement by excavating a 10-by-70-foot channel from deep water inside the bar, across the Laguna Madre, to and including a 300-by-400-foot turning basin at the Point Isabel railroad wharf.[53] This permitted light-draft steamers and sailing vessels that could cross the bar to unload at the wharf rather than having to be lightered off Brazos Island.

Not until 1904 when the St. Louis, Brownsville & Mexico Railway, spearheaded by the interests of the King Ranch, linked Brownsville with Corpus Christi, did Brownsville begin its recovery from the years of geographic isolation. The port at Point Isabel, however, was slated for even harder times. The new railway obtained control of the narrow-gauge Rio Grande Railroad Company line and, "after having disposed of most of its equipment permitted it to deteriorate to such an extent that dependable train service was out of the question." The steam lighter *Luzon* was allowed to sink just off the railroad wharf so as to put the turning basin out of commission and prevent freight transfers, allegedly an act of sabotage

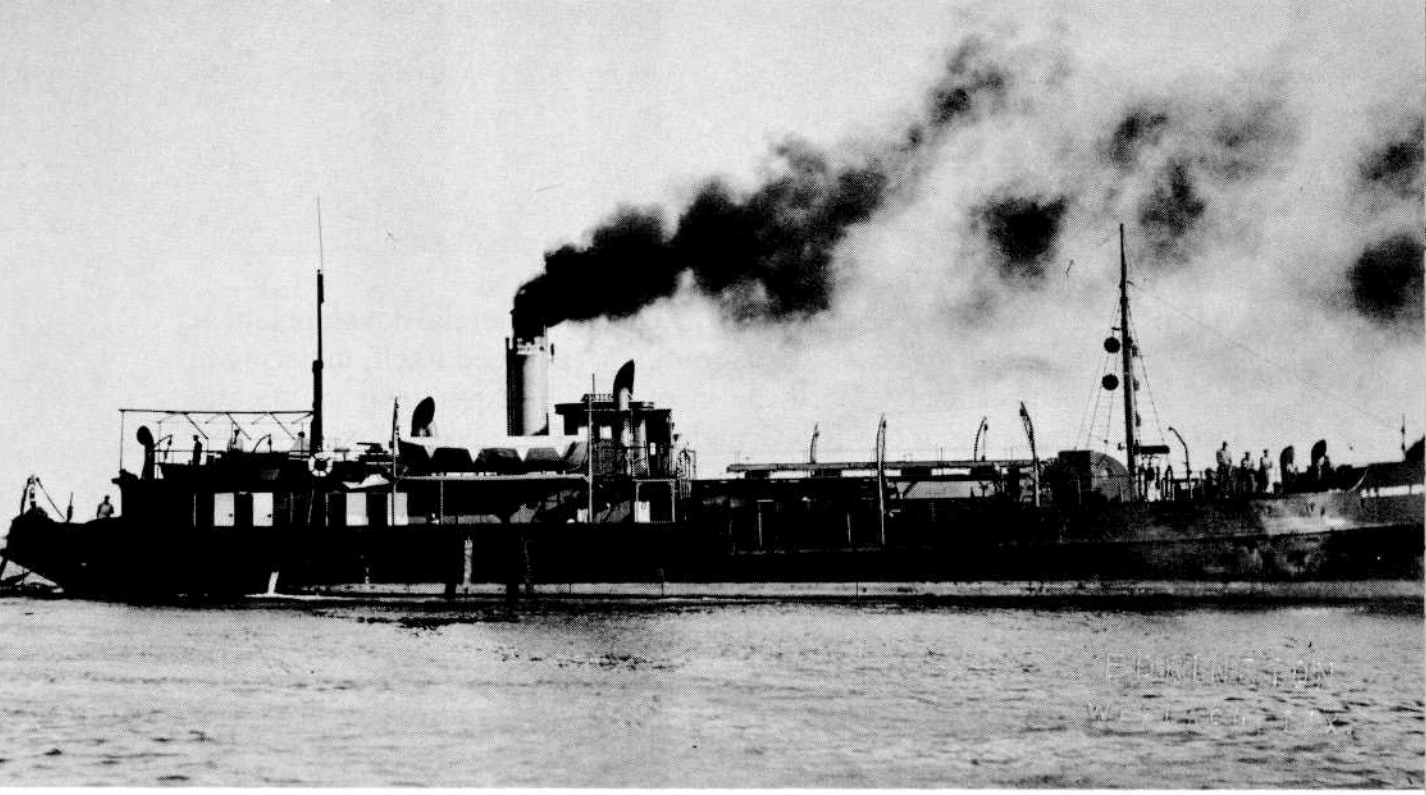
perpetrated by railroad men to impair shipping capability. Brazos Santiago Harbor fell into disuse.[54]

During this virtual moratorium at the port, commercial development at Brownsville and its adjacent areas gradually reversed itself, ushering in a new era of prosperity. With the introduction of pumping plants and irrigation canals along the Rio Grande, acre after acre of formerly arid land became cultivated and began yielding new crops. Fuel for the pumping and other local plants came from about 150,000 barrels of Mexican crude oil imported annually. Ironically, the oil-carrying vessels traveled by water from Tampico, passing within sight of Brazos Santiago, and landed at Aransas Pass, from which point the oil completed its roundabout route to the valley by rail, at a rate of forty-one cents per barrel. In 1910, commercial quantities of oranges and grapefruit were picked in the valley for the first time. By 1919, regional productivity had surpassed the handling capabilities of the single-track St. Louis, Brownsville & Mexico Railway. During one season, thousands of tons of cabbage and other vegetables rotted in the fields and in railroad cars. In 1912, the railroad was reported to have paid in the vicinity of $90,000 to settle claims for perishable freight which the line had accepted and proved unable to transport. Finally, the St. Louis, Brownsville & Mexico Railway sold what remained of the Rio Grande line at auction in 1917. This transaction brought the line under the control of the citizens of Brownsville.[55]

Renewed appeals by Brownsville interests in 1919 were forceful enough to convince the federal government that at least tentative harbor improvements were justified. Congress approved an experimental, five-year project to dredge an entrance channel 18 by 400 feet through the pass, provided local interests finance dredging of a 16-by-100 foot channel from just inside the pass to the turning basin at Point Isabel. Further, local interests were to pay for maintenance of their portion of the improvement, to rebuild the Rio Grande Railroad to standard gauge, and to furnish suitable terminal facilities.[56]

The experimental project got underway in 1923, with dredging first inside the pass and later outside. The outer bar at Brazos Santiago has been considered the roughest along the Texas Coast, largely due to the more abrupt slope of the sea bottom and the greater proximity of deep water.[57] Dredging there constituted an exercise in futility. On one occasion, a dredge that had worked its way in through the pass had to turn around and redredge its way out.

To enable the government hopper dredge *Absecon* to operate safely in the entrance channel, two short stone dikes were erected by June of 1927. The structure starting from Padre Island extended 1,700 feet; that from



U.S. hopper dredge Absecon *dredging first jetty channel at Brazos Santiago, 1926*

Brazos Island, 1,400 feet. During the most favorable weather conditions in August and September, the *Absecon* was delayed by the uncovering of an old wreck in the middle of the channel.[58] This may have been the time when the dredge hit a submerged object and damaged its suction pipes. A diver sent down from Galveston to investigate the obstruction found a large wooden sailing vessel about 15 feet below the surface. The ship, named *Queen of the Seas,* was laden with a cargo of wine. Destruction of this vessel was recommended to clear the channel.

> A great quantity of dynamite was placed on the upper deck from stern to bow. When the charge went off, it sent a column of water skyward that was seen miles away. The concussion of the blast caused the cork stoppers of the wine bottles to pop out. The stoppers floated to the surface, the sea-water took on a pinkish cast, and the air was fragrant with the odor of fine old wine that had aged sixty years in the hull of the vessel.[59]

Dredging operations were concluded by the end of 1927, the channel continued to reshoal rapidly, and the project was discontinued in 1928.

Clearly, permanent improvement at Brazos Santiago called for a more aggressive approach. By this time, a minimum depth of 25 feet would be appropriate to accommodate commercial vessels. Disagreement prevailed, however, over the proper site for the harbor. After a public

hearing at Brownsville on November 21, 1928, three navigation districts were formed: Brownsville, Port Isabel-San Benito, and Arroyo Colorado. Port Isabel-San Benito interests argued for locating the harbor at Point Isabel, which officially changed its name to Port Isabel in that year. Brownsville interests sought instead a direct channel from the pass to terminate at a turning basin 4 miles from the city.[60]

A new Brazos Island Harbor project, authorized in 1930, represented a compromise in that Brownsville and Port Isabel-San Benito both gained their own respective channels and turning basins. The two navigation districts paid construction costs amounting to $1,683,257.70 for all channels inside the pass; the federal government financed jetty construction and the jetty channel. The 25-by-100-foot channel to Port Isabel, which cut off from the straight channel leading inland to Brownsville, and its 600-by-700-foot turning basin were dredged between April 18, 1933 and September 15, 1933. Jetty construction was conducted between November 5, 1933 and February 25, 1935; with funds allotted by the Federal Emergency Administration of Public Works, the north jetty was built to a length of 6,330 feet and the south jetty to 5,092 feet. The U.S. hopper dredge *Absecon*, and later the *Galveston*, deepened the 25-by-300-foot jetty channel between August of 1934 and July 31, 1935. Meanwhile, the job of dredging the new channel to Brownsville and its 1,000-by-1,300-foot turning basin was begun December 20, 1934 and completed February 21, 1936. The new work on the Brazos Island Harbor cost a total of $5,398,749.71.[61]

Status of jetties at Brazos Santiago on August 9, 1934 (Photograph by U.S. Army – Air Corps)

Completed jetties at Brazos Santiago. Brownsville Ship Channel veers to the left in background.

Located at Port Isabel since 1928, the army engineers field office moved to downtown Brownsville shortly after the Brownsville Ship Channel opened. This field office occupied quarters in the Post Office Building on Elizabeth Street most of the time until October, 1972, when the Brownsville Area Office was relocated in a new commercial building, the Boca Chica Towers. During the earlier years, warehouses at the old Fort Brown installation were used for storage by the field office.

The years since 1936 have seen progressive deepening of the channels to the present depth of 36 feet. Interior channels have been widened and both turning basins have been enlarged and extended. By 1946, an additional channel at the junction of the Brownsville and Port Isabel channels was authorized to facilitate movement of vessels between the two ports and to relieve congestion.[62] A three-basin shallow-draft fishing harbor extending north from the Brownsville Ship Channel has been added to the maintenance responsibilities of the Galveston District.

Today, various industries flank the Brownsville Ship Channel. One, of particular interest to the energy situation commanding so much attention in the 1970s, is a company building offshore oil drilling rigs. These gargantuan structures draw 25 feet of water and present an imposing sight along the channel before they are towed to their distant destinations in the North Sea. Another interesting operation on the channel is conducted by a ship dismantling company. Although shipping operations at Brazos Island

Brownsville Ship Channel, looking toward Gulf from turning basin

Harbor represent a somewhat smaller scale than those of the older ports up the coast, the combined Brownsville-Port Isabel tonnage figures continue to grow. The Brownsville Ship Channel that has replaced the long-gone river steamers and the narrow-gauge Rio Grande Railroad built over a century ago bears little resemblance to the lively and turbulent times that preceded it. Nevertheless, it bustles with a new vitality, distinctive of the area it serves.

Notes to Chapter 5

[1] S. Ex. Doc. 1, 33d Cong., 1st sess. (1853-54), 2: 567.

[2] Marilyn McAdams Sibley, *The Port of Houston* (Austin and London: University of Texas Press, 1968), p. 65; Earl Wesley Fornell, *The Galveston Era: The Texas Crescent on the Eve of Secession* (Austin: University of Texas Press, 1961), pp. 29-30.

[3] *Annual Report of the Chief of Engineers to the Secretary of War for the Year 1875* (Washington, D.C.: Government Printing Office, 1875), pp. 934-36 (hereafter cited as *ARCE*, followed by date of fiscal year covered in report).

[4] Rivers and Harbors Act of March 3, 1905, ch. 1482, 33 Stat. 1117.

[5] H.R. Doc. 705, 59th Cong., 1st sess. (1906), p. 7; Rivers and Harbors Act of September 22, 1922, ch. 427, 42 Stat. 1038; *ARCE, 1922*, p. 1150; H.R. Doc. 298, 66th Cong., 1st sess. (1919), p. 3.

[6] *ARCE, 1875*, pp. 937-38; S. Doc. 138, 54th Cong., 2d sess. (1897), p. 4.

[7] S. Doc. 138, 54th Cong., 2d sess. (1897), p. 4.

[8] *Ibid.*, pp. 4-7; H.R. Doc. 1087, 60th Cong., 2d sess. (1908), p. 7; H.R. Doc. 433, 84th Cong., 2d sess. (1956), p. 12; Rivers and Harbors Act of March 3, 1899, ch. 425, 30 Stat. 1121.

[9] H.R. Doc. 1087, 60th Cong., 2d sess. (1908), pp. 2-3, 7-8.

[10] H.R. Doc. 9, 63d Cong., 1st sess. (1913), pp. 3, 9.

[11] *Ibid.*, p. 8.

[12] *Ibid.*, pp. 10-11.

[13] *Ibid.*, p. 10.

[14] H.R. Doc. 1469, 63d Cong., 3d sess. (1914), p. 8.

[15] *Ibid.*, p. 5.

[16] H.R. Comm. Doc. 10, 68th Cong., 2d sess. (1924), pp. 1-3; *ARCE, 1930*, pp. 1094-96.

[17] H.R. Doc. 433, 84th Cong., 2d sess. (1956), pp. 1, 3; Rivers and Harbors Act of July 3, 1958, Pub. L. No. 85-500, 72 Stat. 297; Rivers and Harbors Act of December 31, 1970, Pub. L. No. 91-611, 84 Stat. 818.

[18] S. Ex. Doc. 1, 33d Cong., 1st sess. (1853-54), 2: 562; H.R. Doc. 137, 55th Cong., 2d sess. (1897), pp. 8-9.

[19] H.R. Doc. 137, 55th Cong., 2d sess. (1897), pp. 5-6.

[20] *Ibid.*, pp. 3, 6.

[21] Beach to Schley, 4 August 1925, Construction File no. 600/533b, Civil Works Operations & Maintenance Files, Galveston District Retired Records Predating 1940 (hereafter cited as GDRR). Some evidence suggests Beach made an error on his date of 1884. According to district records, Beach served with the Galveston District from 21 August 1893 to 29 October 1894. H.R. Doc. 137, 55th Cong., 2d sess. (1897), p. 5, indicates that up until 1890, the vicinity received regular lines of steamers and considerable trade. This commerce fell off as a result of railroad expansion and development of Galveston Harbor until, in 1897, only a weekly steamer that had been recently put into service ran between Aransas Pass and Galveston. This would further support a case for Beach's meaning instead the year 1894.

[22] H.R. Doc. 137, 55th Cong., 2d sess. (1897), pp. 7-8.

[23] *ARCE, 1888*, pp. 1314-15, 1317.

[24] H.R. Doc. 137, 55th Cong., 2d sess. (1897), p. 7.

[25] *Ibid.*, pp. 7, 10.

[26] *Ibid.*, p. 11.

[27] *Ibid.*; *General Directory of the City of Galveston 1893-94* (Galveston: Morrison & Fourmy, 1893), p. 382.

[28] H.R. Doc. 137, 55th Cong., 2d sess. (1897), pp. 33, 11-13; *ARCE, 1916*, p. 976; H.R. Doc. 137, 55th Cong., 2d sess. (1897), p. 14.

[29] H.R. Doc. 137, 55th Cong., 2d sess. (1897), p. 17.

[30] Rivers and Harbors Act of March 3, 1899, ch. 425, 30 Stat. 1121; H.R. Doc. 137, 55th Cong., 2d sess. (1897), pp. 16-18.

[31] *ARCE, 1905*, p. 396; *ARCE, 1911*, p. 1802.

[32] Memo, L. P. Morrison to Lt. Col. C. S. Riché, 21 December 1914, Construction File no. 600/506a, GDRR; Memo, Riché to Morrison, 3 October 1914, Construction File no. 600/493, GDRR; Memo, Morrison to Riché, 15 January 1915, Construction File no. 600/508d, GDRR.

[33] Rivers and Harbors Act of June 13, 1902, ch. 1079, 32 Stat. 331; Rivers and Harbors Act of March 3, 1905, ch. 1482, 33 Stat. 1117.

[34] *ARCE, 1912*, p. 719.

[35] Rivers and Harbors Act of March 2, 1907, ch. 2509, 34 Stat. 1073; *ARCE, 1919*, p. 1115.

[36] Rivers and Harbors Act of February 27, 1911, ch. 166, 36 Stat. 933; *ARCE, 1916*, p. 977; Rivers and Harbors Act of March 4, 1913, ch. 144, 37 Stat. 801; *ARCE, 1916*, pp. 976-77; Schley to Beach, 24 July 1925, Construction File no. 600/533a, GDRR; "Brief on Experimental Riprap Spurs, North Jetty, Aransas Pass," 22 July 1925, Construction File no. 600/533, GDRR.

[37] H.R. Doc. 321, 67th Cong., 2d sess. (1922), p. 2.

[38] *ARCE, 1916*, p. 977; Rivers and Harbors Act of March 2, 1907, ch. 2509, 34 Stat. 1073; Rivers and Harbors Act of June 25, 1910, ch. 382, 36 Stat. 630; H.R. Doc. 321, 67th Cong., 2d sess. (1922), pp. 17-18, 20.

[39] H.R. Doc. 321, 67th Cong., 2d sess. (1922), pp. 12-13, 19-21.

[40] Tom Lea, *The King Ranch* (Boston: Little, Brown and Co., 1957), p. 601.

[41] *ARCE, 1927*, p. 977.

[42] H.R. Comm. Doc. 9, 71st Cong., 1st sess. (1929), pp. 4, 7; Rivers and Harbors Act of July 3, 1930, ch. 847, 46 Stat. 918; Rivers and Harbors Act of August 30, 1935, ch. 831, 49 Stat. 1028; Rivers and Harbors Act of March 2, 1945, ch. 19, 59 Stat. 10; Rivers and Harbors Act of June 30, 1948, ch. 771, 62 Stat. 1171; Rivers and Harbors Act of July 3, 1958, Pub. L. No. 85-500, 72 Stat. 297; Rivers and Harbors Act of August 13, 1968, Pub. L. No. 90-483, 82 Stat. 731, 732.

[43] H.R. Doc. 89, 83d Cong., 1st sess. (1953), p. 18; Rivers and Harbors Act of August 30, 1935, ch. 831, 49 Stat. 1028; Rivers and Harbors Act of June 20, 1938, ch. 535, 52 Stat. 802; Rivers and Harbors Act of July 3, 1958, Pub. L. No. 85-500, 72 Stat. 731.

[44] S. Doc. 33, 85th Cong., 1st sess. (1957), p. 11; H.R. Doc. 89, 83d Cong., 1st sess. (1953), pp. 15, 21.

[45] H.R. Doc. 89, 83d Cong., 1st sess. (1953), pp. 26, 30.

[46] Rivers and Harbors Act of September 3, 1954, ch. 1264, 68 Stat. 1248; S. Doc. 33, 85th Cong., 1st sess. (1957), pp. 2-3; Rivers and Harbors Act of July 3, 1958, Pub. L. No. 85-500, 72 Stat. 731; *ARCE, 1959*, p. 711.

[47] S. Doc. 99, 90th Cong., 2d sess. (1968), pp. 35, 98-101.

[48] Grant D. Hall and Kerry A. Grombacher, *An Assessment of the Archeological and Historical Resources to be Affected by the Brazos Island Harbor Waterway Project, Texas*, Texas Archeological Survey, Research Report no. 30 (Austin: University of Texas, 1974), p. 29 (hereafter cited as Hall & Grombacher, *Assessment*).

[49] Lea, *King Ranch*, p. 22.

[50] *Ibid.*, p. 49.

[51] *Ibid.*, pp. 57-59, 72.

[52] *Ibid.*, pp. 536-41; *ARCE, 1879*, p. 920; H.R. Ex. Doc. 140, 53d Cong., 3d sess. (1894), p. 2.

[53] *ARCE, 1905*, p. 1513.

[54] Lea, *King Ranch*, pp. 536-41; Hall & Grombacher, *Assessment*, p. 38; H.R. Doc. 1710, 65th Cong., 3d sess. (1919), p. 27.

[55] H.R. Doc. 1710, 65th Cong., 3d sess. (1919), p. 11; Lea, *King Ranch*, p. 556; H.R. Doc. 1710, 65th Cong., 3d sess. (1919), pp. 27, 8, 10.

[56] Rivers and Harbors Act of March 2, 1919, ch. 95, 40 Stat. 1275; H.R. Doc. 1710, 65th Cong., 3d sess. (1919), p. 3.

[57] H.R. Doc. 1710, 65th Cong., 3d sess. (1919), p. 14.

[58] H.R. Comm. Doc. 9, 70th Cong., 1st sess. (1928), pp. 15-16.

[59] Joyce M. F. Brogdon, "Surveying the Port of Brownsville — A Brief Glimpse (As told by Mr. James F. Jennings)," Xeroxed (Brownsville: Texas Southmost College, 1974), pp. 3-4.

[60] H.R. Comm. Doc. 10, 71st Cong., 1st sess. (1929), pp. 12-13.

[61] Rivers and Harbors Act of July 3, 1930, ch. 847, 46 Stat. 918; *ARCE, 1936*, p. 786; H.R. Comm. Doc. 10, 72d Cong., 1st sess. (1932), p. 3; *ARCE, 1933*, p. 609; *ARCE, 1934*, p. 712; *ARCE, 1935*, p. 816; *ARCE, 1936*, pp. 785, 789.

[62] Rivers and Harbors Act of July 24, 1946, ch. 595, 60 Stat. 634.